Department of the Interior
U.S. Geological Survey

U.S. GEOLOGICAL SURVEY (USGS)/LANDSAT 5 DOWNLINK AUTHORIZATION POLICY

Version 4

February 2004

U.S. GEOLOGICAL SURVEY (USGS)/LANDSAT 5 DOWNLINK AUTHORIZATION POLICY

February 2004

Prepared By:

_____

R. Sergio Hasebe Date
Systems Engineer, DPM
CSC

Approved By:

_____

S. Covington Date
Landsat International Coordinator
The Aerospace Corporation

Reviewed By:

_____

D. Seitz Date
Landsat 5 Mission Scheduling
CSC

Approved By:

_____

R. Smilek Date
Landsat Flight Systems Manager
U.S. Geological Survey

Reviewed By:

_____

M. Headley Date
Landsat MMO Systems Engineer
SAIC

Approved By:

_____

K. Kline Date
Landsat Mission Management Officer
U.S. Geological Survey

USGS EROS Data Center
Sioux Falls, South Dakota

Document History

Document Number	Document Version	Publication Date	Change Number	Keywords
LFO5.009.1	Version 1	December 8, 1998		
LFO5.009.B	Revision B	December 11, 2003		
LFO5.009.C	Revision C	January 12, 2004		
LS-PD-20.4	Version 4	February 23, 2004	LCCR 203	

Contents

List of Figures

List of Tables

Section 1 Introduction

1.1 Scope

This document establishes and records the requirements to begin or halt the operations of image data downlinks from Landsat 5.

1.2 Purpose

The purpose of this document is to establish the procedure for coordinating the authorization and startup or halt of a downlink to an International Ground Station (IGS). This document also describes the information necessary for defining reception boundaries and operating constraints of the IGS.

1.3 Applicability

The requirements specified in this document shall be in effect for the operational period defined in the Station Downlink Authorization Form.

Section 2 Interface Requirements

2.1 Downlink Authorization Timeline

The timeline established for coordinating the downlink authorization and startup is shown in Figure 3-1. Information specified herein shall be exchanged among the United States Geological Survey (USGS), the Landsat 5 Mission Operations Center (MOC) and the IGS, and is depicted in the Downlink Authorization Timeline.

2.2 Operational Interface Requirements

2.2.1 Antenna Survey

The Antenna Survey shall be used to calculate the exact position of each antenna for the acquisition of all image data at the IGS. The Antenna Survey shall be sent to the IGS on Monday no later than four (4) weeks prior to the first week of acquisition. The IGS shall provide antenna location and masking (to the nearest 0.1 degree) to the USGS and the Landsat 5 MOC on Monday no later than three (3) weeks prior to the first week of acquisition. The Antenna Survey is not required for a pre-existing Landsat 5 station, unless the station is a mobile station. The Antenna Survey shall be in the format described in Figure 3-2 and Figure 3-3.

2.2.2 Downlink Authorization Form

The Downlink Authorization Form shall be used to provide point of contact information for the IGS. The Downlink Authorization Form shall be sent to the USGS and the Landsat 5 MOC on Monday no later than four (4) weeks prior to the first week of acquisition. The IGS shall provide the operational point of contact, the station mailing address, the telephone number, the fax number, e-mail address, spacecraft vector type, and station operating hours. The USGS shall provide the station agreement type, the agreement operational period, the applicable resources, and the authorization. Authorization shall only be given by the USGS. The Downlink Authorization Form shall be in the format described in Figure 3-4.

2.2.3 Downlink Status Report

An e-mail notification shall be sent to the USGS and the Landsat 5 MOC within 3 business days in case of abnormal or erroneous downlink.

2.2.4 Station Coverage Map

The Landsat 5 MOC shall provide a station coverage map to the IGS for the purpose of acquisition planning. The station coverage map shall display those scenes that can be reasonably acquired by the IGS. The coverage shall be limited to land regions only and those scenes visible during the descending part of the spacecraft orbit.

2.2.5 Spacecraft Orbital Calendar

The Landsat 5 MOC shall provide the Spacecraft Orbital Calendar to the IGS for the purpose of acquisition planning. The Spacecraft Orbital Calendar shall contain the flight paths that can be reasonably viewed by the ground station and the acquisition dates for each path for the calendar year. The Landsat 5 MOC shall transmit the Spacecraft Orbital Calendar annually to the IGS no later than four (4) weeks prior to the start of the calendar year. The Spacecraft Orbital Calendar shall be in the format described in Figure 3-5.

2.2.6 Special Tasking Authorization Form

The Special Tasking Authorization Form shall be used to approve requests to schedule the spacecraft within five (5) working days of the date of acquisition. The IGS shall provide the IGS station name, Start Date, Stop Date, Target Latitude, Target Longitude and spacecraft resources. The USGS shall send the authorized form to the IGS as soon as it is accepted. Authorization shall only be given by the USGS Flight Systems Manager or his delegate. The Special Tasking Authorization Form shall be in the format described in Figure 3-6.

2.2.7 Service Request Message

The Service Request Message (SRVREQ) shall be used to request the acquisition and transmission of all image data to the IGS. The service request message shall be received by the USGS and the Landsat 5 MOC no later than twelve (12) days prior to the first week of operations. This message shall be in the format described in Figure 3-7. Refer to the International Ground Stations Interface Control Document (GS-LS5-10001) for details on the format and use of this message.

Section 3 Notes

3.1 Communications

The USGS and the Landsat 5 MOC support the following communications methods: fax and E-mail. The IGS must identify for the USGS which communications method is required by their station. Table 3-1 lists the USGS and the Landsat 5 MOC communications addresses, personnel points of contact, their office hours, and their area of responsibility.

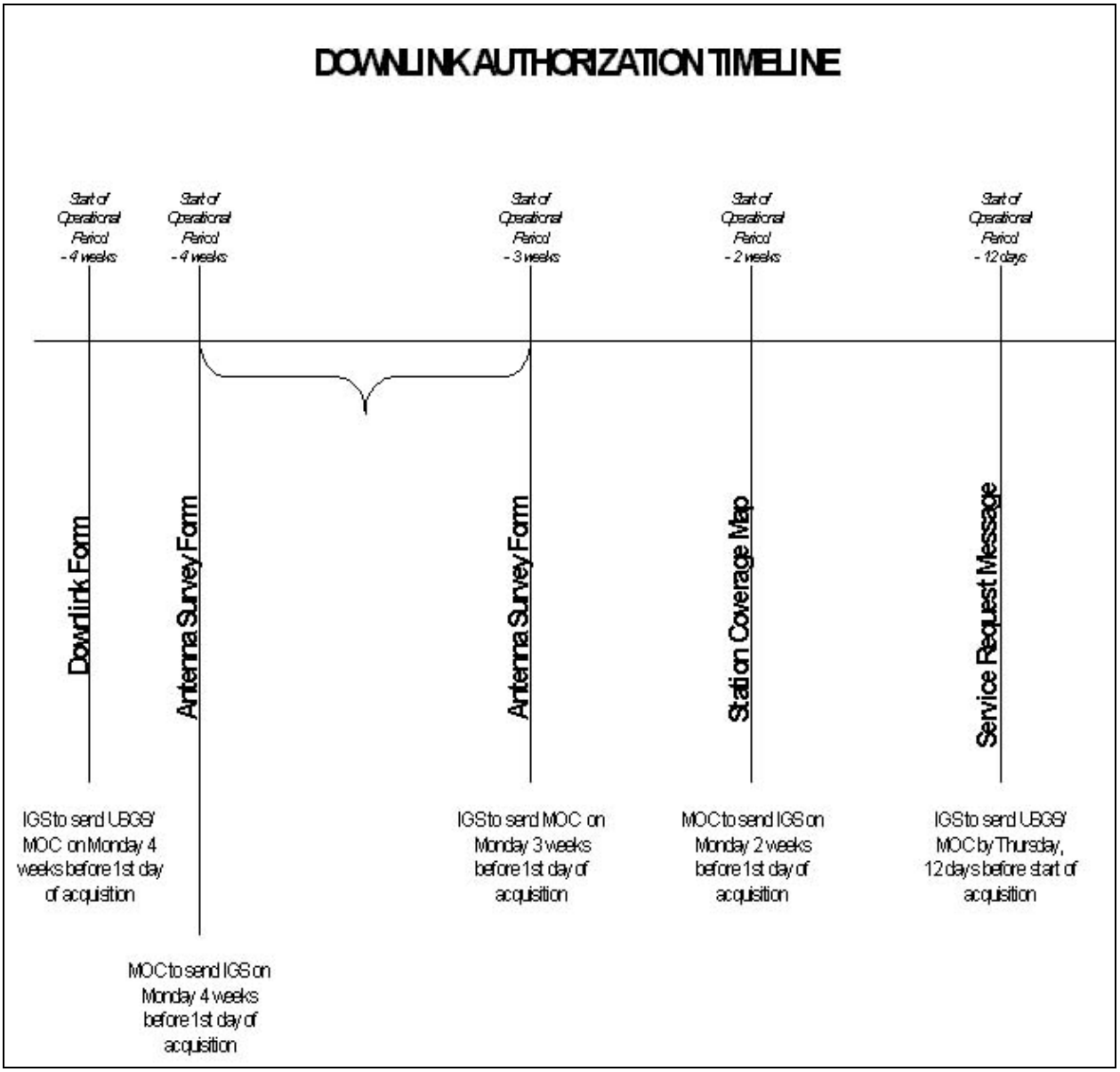


Figure 3-1. Downlink Authorization Timeline

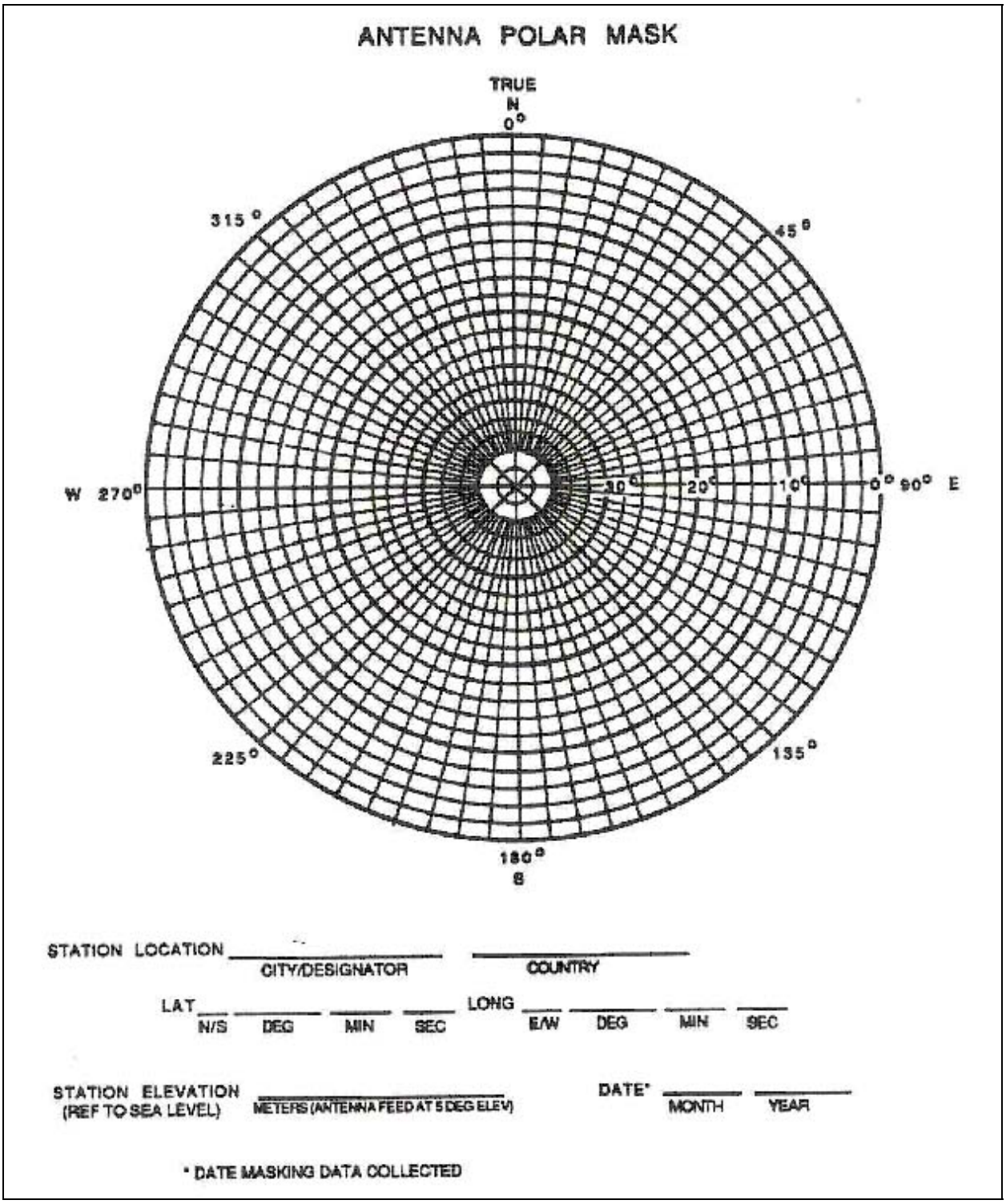
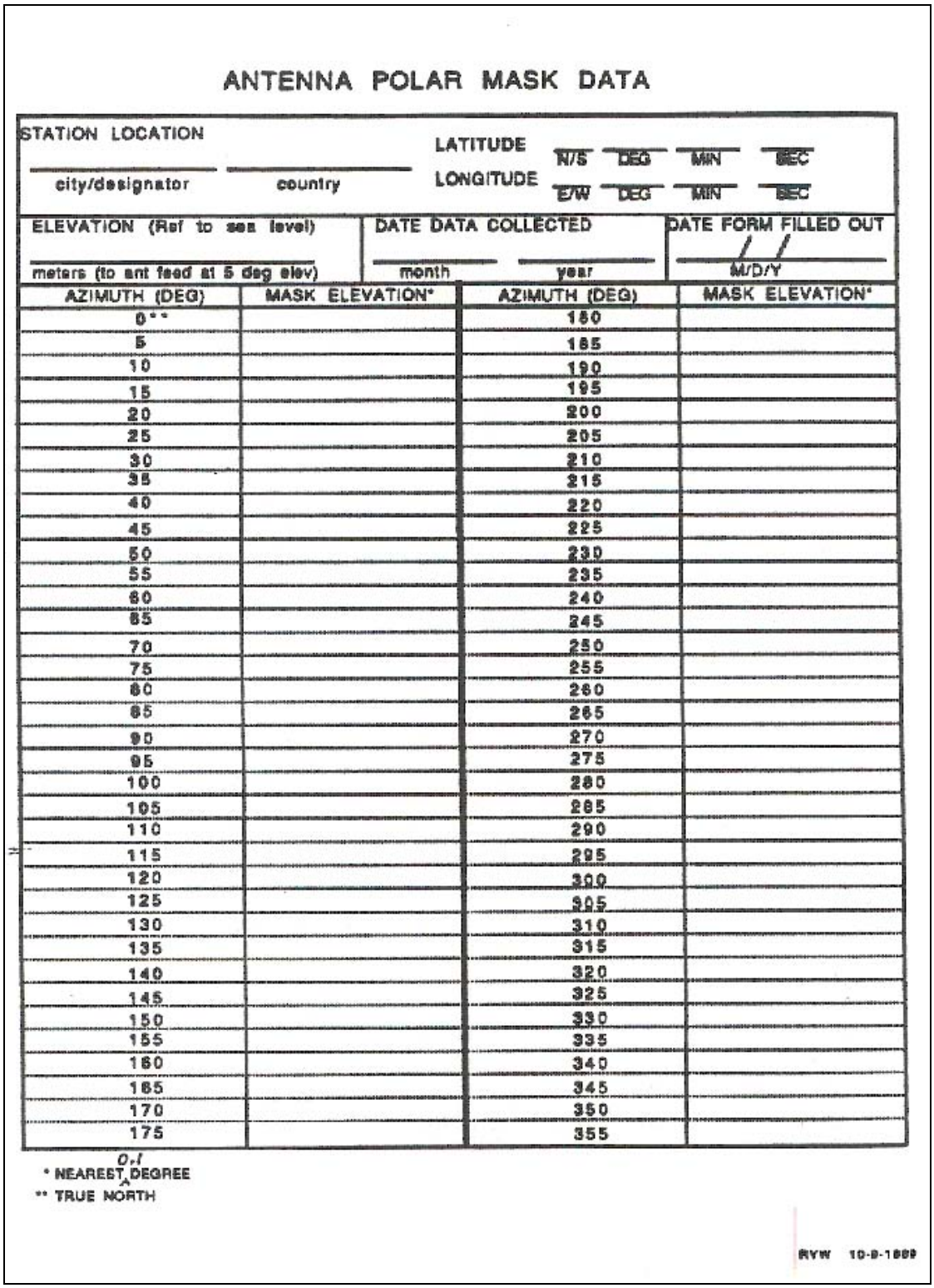


Figure 3-2. Antenna Survey Form – 1



ANTENNA POLAR MASK DATA

STATION LOCATION _____ city/designator _____ country

LATITUDE N/S ___ DEG ___ MIN ___ SEC

LONGITUDE E/W ___ DEG ___ MIN ___ SEC

ELEVATION (Ref to sea level) _____ meters (to ant feed at 5 deg elev)

DATE DATA COLLECTED _____ month _____ year

DATE FORM FILLED OUT ___/___/___ M/D/Y

AZIMUTH (DEG)	MASK ELEVATION*	AZIMUTH (DEG)	MASK ELEVATION*
0**		180	
5		185	
10		190	
15		195	
20		200	
25		205	
30		210	
35		215	
40		220	
45		225	
50		230	
55		235	
60		240	
65		245	
70		250	
75		255	
80		260	
85		265	
90		270	
95		275	
100		280	
105		285	
110		290	
115		295	
120		300	
125		305	
130		310	
135		315	
140		320	
145		325	
150		330	
155		335	
160		340	
165		345	
170		350	
175		355	

* NEAREST 0.1 DEGREE

** TRUE NORTH

RVW 10-9-1999

Figure 3-3. Antenna Survey Form – 2

STATION DOWNLINK AUTHORIZATION FORM

Purpose: Start Service ____ Stop Service ____ Renewal___

Station Name and Designator: _____

Station Authorization Type: IGS Subscription: ____
Downlink Testing: ____

Authorized Operational Period: Start Date: __/__/__

Stop Date: __/__/__

Applicable Resources: Landsat: MSS__ TM__

IGS Contact Person: _____
Title: _____

Station Mailing Address: _____
_____
_____

Shipping / Receiving Address: _____
_____
_____

Telephone Number: _____
FAX Number: _____
Station E-mail Address: _____

Spacecraft Vector Type: NORAD ____
IIRV ____
BME ___

Station Operating Hours: From_____ (GMT) to_____(GMT)

AUTHORIZED BY: _____ Date: ___/___/___

NOTE: USGS currently has no plan to support and provide MSS data.

Figure 3-4. Station Downlink Authorization Form

PATH	106 122 138	113 129 145	120 136	111 127 143	118 134	109 125 141	116 132	107 123 139	114 130	105 121 137	112 128 144	119 135	110 126 142	117 133	108 124 140	115 131
JANUARY																1
(31)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
FEBRUARY															1	2
(59)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	19	20	21	22	23	24	25	26	27	28						
MARCH											1	2	3	4	5	6
(90)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	23	24	25	26	27	28	29	30	31							
APRIL										1	2	3	4	5	6	7
(120)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	24	25	26	27	28	29	30									
MAY								1	2	3	4	5	6	7	8	9
(151)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	26	27	28	29	30	31										
JUNE							1	2	3	4	5	6	7	8	9	10
(181)	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	27	28	29	30												
JULY					1	2	3	4	5	6	7	8	9	10	11	12
(212)	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	29	30	31													
AUGUST				1	2	3	4	5	6	7	8	9	10	11	12	13
(243)	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	30	31														
SEPTEMBER			1	2	3	4	5	6	7	8	9	10	11	12	13	14
(273)	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
OCTOBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(304)	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
NOVEMBER																1
(334)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
DECEMBER															1	2
(365)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	19	20	21	22	23	24	25	26	27	28						

Figure 3-5. Sample Spacecraft Orbital Calendar

SPECIAL TASKING AUTHORIZATION FORM

This form is for authorizing downlink requests that will be charged a special tasking fee. All requests that are submitted within 5 working days of the date of acquisition shall be subject to a special tasking fee. Note that only the TM resource is available.

IGS: _____

Start Date: ____/____/____

Stop Date: ____/____/____

Target Latitude: _____deg _____min _____sec N / S

Target Longitude: _____deg _____min _____sec E / W

Resources:

Authorized By: _____ ____/____/____

Figure 3-6. Special Tasking Authorization Form

```
DEST: LAM
ATTN: MISSION PLANNING
ORIG: XXX
FROM: AAAAAAAAAAAAAAAAAAAA
TYPE: SRVREQ
DTG:  dd-mmm-yyyy hh:mm:ss
SEQ:  nnn
DATE            S/C    PATH    START    STOP    SENSOR   TARGET LATITUDE         TARGET LONGITUDE
                                ROW      ROW
dd-mmm-yyyy     LS5    nnn     nnn      nnn     TM       deg*mn'sc.nn" A         deg*mn'sc.nn" B



TEXTEND:
```

Figure 3-7. Service Request Message

LANDSAT 5 MISSION OPERATIONS CENTER

Destination: LAM

Mailing Address: Landsat 5
4300 Forbes Blvd.
Lanham, Md. 20706 USA

FAX Number: 001-301-577-7865

E-Mail Address: L5FOT@CSC.COM

Points Of Contact

Area of Responsibility	*Name*		*Number*	*Business Hours*
Landsat Control Center	Flight Controller on duty	phone: FAX: e-mail:	001-301-429-6611 001-301-577-7865 l5fot@csc.com	(Oct. - Apr.) 1215z - 0645z (Apr. - Oct.) 1115z - 0545z
Mission Scheduling:	Dottie Seitz	phone: FAX: e-mail:	001-301-429-6608 001-301-577-7865 dseitz@csc.com	(Oct. - Apr.) 1300z - 2200z (Apr. - Oct.) 1200z - 2100z
Director, Operations	K.C. Leung	Phone: FAX: e-mail:	001-301-794-4059 001-301-794-8380 kleung@csc.com	(Oct. - Apr.) 1300z - 2200z (Apr. - Oct.) 1200z - 2100z

Table 3-1. Landsat 5 Flight Operations Points Of Contact

Appendix A Glossary

Acquisition day: The day for which image data is scheduled to be downlinked to the IGS

Acquisition week: The week of the scheduled acquisition beginning Monday and ending on Sunday

Appendix B Acronyms

ATTN	Attention
BME	Brouwer Mean Elements
DEG	Degree
DEST	Destination
DTG	Date-Time-Group
E/W	East/West
EROS	Earth Resources Observation Systems
FOT	Flight Operations Team
GMT	Greenwich Mean Time
GS	Ground Segment
IGS	International Ground Station
IIRV	Improved Inter-Range Vectors
LAM	Landsat Acquisition Manager
LAT	Latitude
LONG	Longitude
LS5	Landsat 5
M/D/Y	Month/Day/Year
Md.	Maryland
MIN	Minute
Mn	Minute
MOC	Mission Operations Center
MSS	Multispectral Scanner
N/S	North/South
NORAD	North American Air Defense; NORAD two-line elements
ORIG	Originator
S/C	Spacecraft
sc	Second
SEC	Second
SEQ	Sequence

SRVREQ	Service Request message
TM	Thematic Mapper
USGS	United States Geological Survey
z	Zulu time

References

The latest published version of these documents shall apply. They are available at:

http://landsat7.usgs.gov/igsdocsl5.php

LS-ICD-41. Landsat 5 International Ground Station (IGS) Interface Control Document (ICD).